

WHAT IS CLAIMED IS:

1 1. A method for providing printer recognition and management of a print
2 job entity, comprising:

3 establishing a repository of attributes and status information associated with
4 each print job that passes through a printer system; and

5 providing an interface to a plurality of components to allow access to the
6 attributes and status information in the repository by the plurality of components.

1 2. The method of claim 1 wherein the interface comprises at least one of
2 a Web Page channel, a multiplexer to manage the routing of jobs to the print engine
3 and a spooler, a job control function interface, a pipeline interface, an operations
4 panel interface and a pull print interface.

1 3. The method of claim 1 further comprising providing by the interface an
2 ability for components to process a job according to requirements of the component
3 and reporting job attributes and processing status of the job for common access by
4 other components.

1 4. The method of claim 1 further comprising providing by the interface
2 access to maintained job variable to the components.

1 5. The method of claim 1 further comprising providing by the interface to
2 a component access to common variables, the components presenting job attributes
3 or status to the interface.

1 6. The method of claim 5 wherein the attributes are presented according
2 to requirements dictated by the interface

1 7. The method of claim 1 wherein the interface provides the ability for
2 components to create job entries, obtain and set job attributes, manipulate the state
3 and status of jobs in the system, and obtain job ordering information pertinent to the
4 calling component.

1 8. The method of claim 1 wherein the repository provides a global view of
2 jobs within the printer, the global view includes an actively printing job, jobs in the
3 process of being spooled, jobs on the spool queue, and jobs on the pull print queue.

1 9. The method of claim 1 wherein the interface accommodates either
2 implementation of port connection managers and pass job information from a port
3 connection manager to the repository.

1 10. The method of claim 1 wherein the interface cancels jobs.

1 11. The method of claim 10 wherein a cancelled job comprises a current
2 job.

1 12. The method of claim 10 wherein a cancelled job comprises a job
2 having a selected attribute.

09753470-010301
T0E0T044E260

1 13. The method of claim 1 further comprising providing logical views to
2 obtain a next job to be processed by a component and to obtain a list of all jobs in
3 the order that they are processed.

1 14. The method of claim 1 further comprises establishing a job monitor for
2 obtaining a Job ID, performing a query for attributes of a job, updating job attributes,
3 canceling jobs, providing logical views of a job, handling printer events, getting
4 attributes of the printer and setting printer attributes.

1 15. The method of claim 14 wherein the attributes are updated through the
2 job monitor.

1 16. The method of claim 14 wherein the job monitor provides the ability for
2 any component to set job attributes.

1 17. The method of claim 14 wherein the job monitor uses job states to
2 control the flow of jobs.

1 18. The method of claim 14 further comprising responding by the job
2 monitor to a component call, wherein the job monitor determines a next job to
3 process and wherein the component determines valid states for a call.

1 19. The method of claim 18 further comprising maintaining a valid state for
2 a multiplexer.

1 20. The method of claim 19 wherein the maintaining a valid state for a
2 multiplexer further comprises:

3 placing an incoming job into an unknown state when a job identification is
4 requested;

5 placing the incoming job in the Pull Print queue when the job is stop-flowed at
6 a port connection manager waiting for access to the printer because a print engine
7 is processing another job; and

8 selecting the incoming job and processing the job according to whether the
9 job must be spooled, may spool or must print.

1 21. The method of claim 20 wherein the incoming job is routed to the print
2 engine or the spooler according to which comes first when the job is a job that may
3 spool.

1 22. The method of claim 20 wherein the incoming job is placed in a
2 pending spooler when the job is a job that must be spooled.

1 23. The method of claim 20 further comprising indicating a done state for
2 the multiplexer when the job has been printed.

1 24. The method of claim 18 further comprising maintaining a valid state for
2 a spooler.

1 25. The method of claim 24 wherein the maintaining a valid state for a
2 spooler further comprises:
3 receiving a job identification request;
4 entering a not spooled state when the spooler has not yet processed the job;
5 entering a spooling, can despool state when the job is being written to the
6 spool device thereby allowing the job to be selected for despooling at any time;
7 entering a spooling, despooling state when the job is being written to the
8 spool device and is also being read from the spool device;
9 entering a waiting to despool state when the end of the job has been
10 received;
11 entering a despooling state when the job is being read from the spool device
12 and written to the multiplexer; and
13 entering the done state when the job is finished being processed by the
14 spooler.

1 26. The method of claim 25 wherein a job that is printed directly and not
2 processed by the spooler remains in the not spooled state.

1 27. The method of claim 18 further comprising maintaining a valid state for
2 an interpreter.

1 28. The method of claim 27 wherein the maintaining a valid state for a
2 interpreter further comprises:

3 entering a waiting for data stated when job processing by the interpreter has
4 started;

5 entering an interpreting state when the job is being processed by the
6 interpreter; and

7 entering a done state when the job is finished being processed by the
8 interpreter.

1 29. The method of claim 18 further comprising maintaining a valid state for
2 a print engine.

1 30. The method of claim 29 wherein the maintaining a valid state for a
2 print engine further comprises:

3 entering a waiting for pages state when job processing by an interpreter has
4 not yet started;

5 entering a waiting for pages state when the job has started;

6 entering the pages queued state when one or more pages for the job have
7 been created by the interpreter and written to the page buffer;

8 entering the pages printing state when one or more pages for the job have
9 been delivered to the output tray; and

10 entering the done state when the last page for the job has been delivered to
11 the output tray.

1 31. The method of claim 1 further comprising handling incoming jobs with
2 a port connection manager, wherein the port connection manager calls to a
3 multiplexer to process the job.

1 32. The method of claim 1 further comprising deciding whether to assign a
2 job to the printer, whether to assign a job to a spooler, whether the job must wait for
3 available resources or whether the job cannot be processed.

1 33. The method of claim 1 further comprising requesting from a job
2 monitor a job identification prior to processing the job by a multiplexer.

1 34. The method of claim 33 further comprising storing the job identification
2 in a job table and clearing the job identification from the table when an end of job is
3 called by a port connection manager.

1 35. The method of claim 1 further comprising providing a job monitor to
2 fetch jobs in an order that is dependent upon the calling component.

1 36. The method of claim 35 further comprising examining by the job
2 monitor process job states and variables to determine the correct response and to
3 return an appropriate job identification for a job.

1 37. The method of claim 1 further comprising providing an event
2 registration to provide a methodology for a controller to indicate events to a job
3 monitor, wherein the Job Monitor serves as the system focal point for tracking job
4 related events as they occur during the course of an entire print process.

1 38. The method of claim 37 further comprising defining events for the job
2 monitor.

1 39. The method of claim 1 further comprising providing a job monitor for
2 addressing job processing complexity by viewing a job on a higher conceptual plane
3 rather than managing a collection of attributes and status variables that is unique for
4 each data channel.

1 40. The method of claim 1 further comprising providing a job monitor for
2 providing a common method of accessing the variables associated with a job for the
3 components.

1 41. An apparatus for providing printer recognition and management of a
2 print job entity, comprising:
3 a repository of attributes and status information associated with each print job
4 that passes through a printer system; and
5 an interface to a plurality of components, the interface providing access to the
6 attributes and status information in the repository by the plurality of components.

1 42. The apparatus of claim 41 wherein the interface comprises at least
2 one of a Web Page channel, a multiplexer to manage the routing of jobs to the print
3 engine and a spooler, a job control function interface, a pipeline interface, an
4 operations panel interface and a pull print interface.

1 43. The apparatus of claim 41 wherein the interface provides an ability for
2 components to process a job according to requirements of the component and
3 reports job attributes and processing status of the job for common access by other
4 components.

1 44. The apparatus of claim 41 wherein the interface provides access to
2 maintained job variable to the components.

1 45. The apparatus of claim 41 wherein the interface provides a component
2 access to common variables, the components presenting job attributes or status to
3 the interface.

1 46. The apparatus of claim 45 wherein the attributes are presented
2 according to requirements dictated by the interface

1 47. The apparatus of claim 41 wherein the interface provides the ability for
2 components to create job entries, obtain and set job attributes, manipulate the state
3 and status of jobs in the system, and obtain job ordering information pertinent to the
4 calling component.

1 48. The apparatus of claim 41 wherein the repository provides a global
2 view of jobs within the printer, the global view includes an actively printing job, jobs
3 in the process of being spooled, jobs on the spool queue, and jobs on the pull print
4 queue.

1 49. The apparatus of claim 41 wherein the interface accommodates either
2 implementation of port connection managers and pass job information from a port
3 connection manager to the repository.

1 50. The apparatus of claim 41 wherein the interface cancels jobs.

1 51. The apparatus of claim 50 wherein a cancelled job comprises a current
2 job.

1 52. The apparatus of claim 50 wherein a cancelled job comprises a job
2 having a selected attribute.

1 53. The apparatus of claim 41 wherein the a repository and interface are
2 provided by a job monitor, the job monitor further providing logical views to obtain a
3 next job to be processed by a component and to obtain a list of all jobs in the order
4 that they are processed.

1 54. The apparatus of claim 41 wherein the job monitor obtains a Job
2 identification, performs a query for attributes of a job, updates job attributes, cancels
3 jobs, provides logical views of a job, handles printer events, gets attributes of the
4 printer and sets printer attributes.

1 55. The apparatus of claim 54 wherein the attributes are updated through
2 the job monitor.

1 56. The apparatus of claim 54 wherein the job monitor provides the ability
2 for any component to set job attributes.

1 57. The apparatus of claim 54 wherein the job monitor uses job states to
2 control the flow of jobs.

1 58. The apparatus of claim 54 wherein the job monitor responds to a
2 component call, determines a next job to process, the component determining valid
3 states for a call.

1 59. The apparatus of claim 58 further comprising a multiplexer.

1 60. The apparatus of claim 59 wherein the valid states for a multiplexer
2 further comprise:

3 an unknown stated for when a job identification is requested; and

4 a pull print queue state for the job when the job is stop-flowed at a port
5 connection manager waiting for access to the printer because a print engine is
6 processing another job;

7 wherein the multiplexer receives the job and selects to place the job in a job
8 must be spooled state, a may spool state or must print state.

1 61. The apparatus of claim 60 wherein the multiplexer routes the incoming
2 job to the print engine or the spooler according to which becomes available first
3 when the job is a job that may spool.

1 62. The apparatus of claim 60 wherein the multiplexer places an incoming
2 job in a pending spooler when the job is a job that must be spooled.

1 63. The apparatus of claim 60 wherein the multiplexer enters a done state
2 for the multiplexer when the job has been printed.

1 64. The apparatus of claim 58 further comprising a spooler.

1 65. The apparatus of claim 64 wherein the spooler receiving a job
2 identification request, enters a not spooled state when the spooler has not yet
3 processed the job, enters a spooling, can despool state when the job is being
4 written to the spool device thereby allowing the job to be selected for despooling at
5 any time, enters a spooling, despooling state when the job is being written to the
6 spool device and is also being read from the spool device, enters a waiting to
7 despool state when the end of the job has been received, enters a despooling state
8 when the job is being read from the spool device and written to the multiplexer and
9 enters the done state when the job is finished being processed by the spooler.

1 66. The apparatus of claim 65 wherein a job that is printed directly and not
2 processed by the spooler remains in the not spooled state.

1 67. The apparatus of claim 58 further comprising an interpreter.

1 68. The apparatus of claim 67 wherein the interpreter enters a waiting for
2 data stated when job processing by the interpreter has started, enters an
3 interpreting state when the job is being processed by the interpreter and enters a
4 done state when the job is finished being processed by the interpreter.

1 69. The apparatus of claim 58 further comprising a print engine.

1 70. The apparatus of claim 69 wherein the print engine enters a waiting for
2 pages state when job processing by an interpreter has not yet started, enters a
3 waiting for pages state when the job has started, enters the pages queued state
4 when one or more pages for the job have been created by the interpreter and
5 written to the page buffer, enters the pages printing state when one or more pages
6 for the job have been delivered to the output tray and enters the done state when
7 the last page for the job has been delivered to the output tray.

1 71. The apparatus of claim 41 wherein the a repository and interface are
2 provided by a job monitor, the job monitor further handling incoming jobs with a port
3 connection manager, wherein the port connection manager calls to a multiplexer to
4 process the job.

1 72. The apparatus of claim 41 wherein the a repository and interface are
2 provided by a job monitor, the job monitor further deciding whether to assign a job to
3 the printer, whether to assign a job to a spooler, whether the job must wait for
4 available resources or whether the job cannot be processed.

1 74. The apparatus of claim 73 wherein the job identification is stored in a
2 job table, the job monitor clearing the job identification from the table when an end
3 of job is called by a port connection manager.

1 76. The apparatus of claim 75 further comprising a job monitor for
2 examining process job states and variables to determine the correct response and
3 to return an appropriate job identification for a job.

1 77. The apparatus of claim 41 further comprising a job monitor for serving
2 as a focal point for tracking job related events as they occur during the course of an
3 entire print process.

1 78. The apparatus of claim 77 further comprising events definitions for the
2 job monitor.

1 79. The apparatus of claim 41 further comprising a job monitor for
2 addressing job processing complexity by viewing a job on a higher conceptual plane
3 rather than managing a collection of attributes and status variables that is unique for
4 each data channel.

1 80. The apparatus of claim 41 further comprising a job monitor for
2 providing a common method of accessing the variables associated with a job for the
3 components.

1 81. An article of manufacture comprising a program storage medium
2 readable by a computer, the medium tangibly embodying one or more programs of
3 instructions executable by the computer to perform a method for providing printer
4 recognition and management of a print job entity, the method comprising:

5 establishing a repository of attributes and status information associated with
6 each print job that passes through a printer system; and

7 providing an interface to a plurality of components to allow access to the
8 attributes and status information in the repository by the plurality of components.

09753470-010301